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**Anthony J. Pack
General Manager
Eastern Municipal Water District (EMWD)
(Letter dated September 16, 2004)**

EMWD Comments presented orally by Jayne Joy at the September 17, 2004 Board workshop)

Comment 1

The TMDL numeric targets for phosphorus and nitrogen will be included in recycled water discharge permits. The cost associated with meeting these numeric targets is significant.

Staff Response

First, a clarification of terms is appropriate. The proposed interim and final numeric TMDL targets are the goals for the receiving waters, while wasteload and load allocations apply to nutrient inputs from individual sources, such as recycled water. The purpose of these allocations is to assure that, cumulatively, the numeric targets will be met. If and when US EPA approves the proposed TMDLs, the WLAs for recycled water, not the lake numeric targets, would be incorporated into the permit.

Compliance with the wasteload allocations will likely require facility/operational changes and/or the implementation of a suitable offset program. Board staff encourages EMWD to investigate the costs of facility modifications; we are aware that very restrictive nutrient effluent limitations, comparable to those that would be required to be met pursuant to these TMDLs, if adopted, are being met elsewhere without extraordinary expenditure.

Comment 2

Although, it is stated that the TMDL numeric targets are solely numeric targets, in reality they will be used as water quality objectives. Therefore, economic analysis needs to be performed.

Staff Response

See response to Comment 68 in the September 17, 2004 Staff Report, Attachment B.

Comment 3

EMWD is concerned that the available mitigation projects will not meet watershed demands necessary to reach numeric targets. EMWD recommends that time be provided to evaluate the viability of pollutant trading and offset mitigation options.

Staff Response

Staff is not clear to which mitigation projects EMWD refers. In the proposed Basin Plan Amendment, staff has proposed a new Task 11 for the development of a Pollutant Trading Plan. The proposed due date for submittal of the Pollutant Trading Plan is two years after the TMDLs have been approved by US EPA. It is staff's opinion that this is sufficient time to allow stakeholders to evaluate all potential mitigation projects, as EMWD requested. We note that EMWD has not provided a proposed alternate due date or provided justification for why more than two years may be needed to develop the Pollutant Trading Plan.

Comment 4

EMWD would support the continuation of the pilot project for use of supplemental (recycled) water during the dry weather to ensure and stabilize the lake level. Without the pilot project, adoption of the TMDL would effectively prevent EMWD from contributing any recycled water to Lake Elsinore.

Staff Response

Staff recognizes the importance of a stable lake level and that a practical source of supplemental water to the lake is recycled water. Recognizing the importance of recycled water to Lake Elsinore, staff has recommended an allocation of a portion of the TMDL to this source. The need for water inputs to Lake Elsinore, however, does not take precedence over the need to control nutrient inputs (phosphorus and nitrogen) that have caused excessive algal growth, and depletion of oxygen, which have contributed to or caused fish kills. Obviously, the need to control nutrients must be balanced with the Lake water needs. Staff believes that the proposed TMDL does take these factors into account. All nutrient sources, including recycled water, must reduce the nutrient loads to the lake in order for lake water quality to improve. Staff believes that conventional and natural treatment processes exist to reduce nutrients in recycled water. Further, offsets programs or pollutant trading are an option to mitigate discharges of nutrients. Staff is committed to continuing to work with EMWD to develop appropriate options to enable recycled water discharges to Lake Elsinore to continue.

Comment 5

EMWD indicates that their cost estimates to treat recycled water to meet the proposed TMDL are \$37,000,000, based on studies conducted by Carollo Engineers. These costs represent treating 8MGD; costs would increase proportionately when the treatment plant expands to 18MGD. EMWD further clarifies that LESJWA costs for treating recycled water (as referenced in the September 17, 2004 Staff Report, Attachment B - Response to Comments, Comment No. 69), applies only to phosphorus removal and does not include nitrogen removal.

Staff Response

Comment noted. See response to comment 1, above.

The following are specific comments on the proposed TMDL (Attachment to Resolution No. R8-2004-0037):

Comment 6

Page 4. The phosphorus and nitrogen targets listed in Table 5-9n are set at levels that cannot be attained without significant treatment costs and it is requested that an economic analysis be included in the TMDL.

Staff Response

See response to Comment 1 and Comment 2.

Comment 7

Page 7: It is our understanding that the waste load allocation for supplemental (recycled) water is based on total phosphorus of 0.2 mg/L, Table 5-9r for the final total phosphorus appears to be set at 0.1 mg/L.

Staff Response

The phosphorus WLA for the recycled water was calculated by multiplying an average volume of recycled water needed over 10-year period, by 0.5 mg/L for the interim compliance period (10-year) and 0.1 mg/L for the final compliance period (15-year). The May 2004 staff report, page 73, stated that 0.2 mg/L was used to calculate the final WLA for recycled water. This was an error in the staff report.

Comment 8

Page 8 D – the last paragraph states that “Compliance with numeric targets will ensure water quality improvements that prevent excessive algae blooms and fish kills, particularly during the critical summer period when these problems are most likely to occur.” This is a broad statement that does not take into account the cost of achieving the numeric targets and other lake dynamics, such as low lake level, that may impact the aesthetics of the lake.

Staff Response

The referenced section is meant to discuss the critical condition of the lake with regard to nutrient input and how the TMDLs have attempted to address the critical condition. Staff certainly agrees that low lake levels or a dry lake affect the aesthetic and other beneficial uses of the lake and have dealt with those issues by recognizing that supplemental water is needed to stabilize the lake level. Accordingly, the proposed Elsinore TMDL includes wasteload allocations for recycled water inputs to the Lake.

Comment 9

Task 3.1, 3.2, 8, 10, and 11 – EMWD is listed as a responsible party for the studies associated with these tasks. Due to the significant costs associated with the meeting numeric targets, it may not be feasible for EMWD to provide supplemental water to the lake. If EMWD cannot participate, then EMWD should not be listed as a responsible party.

Staff Response

EMWD is currently in discussions with the Regional Board staff regarding potential permit requirements for recycled water discharges to Lake Elsinore as part of the District's permit renewal. Therefore, staff does not believe that it is appropriate to remove EMWD from the requirements specified in the TMDL at this time. Staff has included language in the Basin Plan amendment specifying that, if at a later date EMWD decides not to discharge recycled water to Lake Elsinore, EMWD will be removed from the responsibility for the TMDL tasks mentioned above (see the Attachment to Resolution R8-2004-0037).

**Warren D. Williams
General Manager-Chief Engineer
Riverside County Flood Control and Water Conservations District (District)
(Letter dated October 13, 2004)**

District comments presented orally by Jason Uhley at the September 17, 2004 Board workshop)

Comment 10

Due in large part to the efforts of the Regional Board staff to work with the stakeholders to write the TMDLs in a fashion to allow further development of the science and understanding of the watershed and ultimately revise the numeric targets, the District is willing to look past the scientific and technological deficiencies and agree to participate in a cooperative effort with all the identified parties. We look forward to have the Regional Board's continued active participation in this TMDL effort, including providing technical guidance, assistance in obtaining grant funding, and judicial application of regulatory tools available to them.

Staff Response

Staff appreciates the willingness of the District to participate in a cooperative effort to improve the water quality of Canyon Lake and Lake Elsinore. Given the watershed hydrology, complex land uses in the watershed and the history of fish kills and algal blooms in Lake Elsinore, Board staff believes that the cooperation of all stakeholders will be vital to improve the water quality and beneficial uses of the lakes.

Subject to resource constraints, it is Regional Board staff's desire and intent to stay actively involved in the implementation of this TMDL. Staff involvement could include issuing waste discharge requirements, enforcing the permit conditions and continuing to work with the stakeholders to obtain grant funding to carry out projects that will improve water quality in the watershed. As you know, TMDL development and implementation is the highest priority for the State and Regional Board for grant funded projects. Staff will also stay involved in activities related to the monitoring and model updates of the lakes and watershed in order to better facilitate any needed revisions to the TMDLs in the future.

Comment 11

The TMDL compliance schedule needs to recognize the lack of an organizational structure for implementing the TMDL program. The TMDL doesn't identify who's in charge, what basis for financial responsibility is. It is going to take a significant amount of time, particularly more time than specified in the TMDL, to develop the organizational structure capable of producing specified compliance documents and cooperative implementation agreements.

Staff Response

Board staff recognizes the importance of stakeholders cooperatively working together to implement the proposed TMDL. However, the Regional Board has no legal authority to dictate the stakeholder group structure or the financial responsibility distribution of such a group. It is staff's opinion that this effort is the responsibility of the implementing stakeholders. Nonetheless, Board staff is willing to work with the stakeholders to assist in the formation of a stakeholder group.

We note that based on June 3, 2004 comments from the RCFCD, due dates for specific tasks were modified in the proposed TMDL/Basin Plan Amendment (see September 17,

2004 Staff Report, Attachment A). Staff believes that the revised compliance dates allow sufficient time to form a stakeholder group and we understand that such an effort has been initiated.

See also comment 14 below for additional compliance dates modifications that staff supports.

Comment 12

The Regional Board should facilitate the TMDL implementation organizational effort by clearly identifying all responsible parties, including agricultural entities. The Regional Board should also clearly identify the regulatory tools that can be utilized to assist stakeholders in gaining the support of various responsible parties.

Staff Response

In the proposed TMDL/Basin Plan Amendment, Board staff has identified the responsible parties for each task and compliance schedules. We agree with the recommendation to also include a task in the TMDL for Regional Board staff to compile a list of responsible agricultural operators for implementing the TMDL and to notify those operators of their responsibility. Staff proposes that this task be completed no later than 1 month from TMDL approval in order to ensure that the monitoring program due dates are met (the proposed monitoring program, Task 3, is due no later than 3 months from TMDL approval). This modification to the proposed TMDL is shown in the Attachment to Resolution No. R8-2004-0037.

Staff does not believe that additional clarification of the enforcement tools available to the Regional Board needs to be included as part of the TMDL. Once the TMDL is incorporated into the Basin Plan, all the regulatory tools specified in the Porter – Cologne Water Quality Control Act (California Water Code Section 13000 *et seq.*) are available to the Regional Board, should the responsible parties fail to comply with the specified tasks on schedule. In addition, discussion of these enforcement options is already included in the Basin Plan (Chapter 5 – Implementation).

Comment 13

Regional Board should provide launching point for TMDL implementation. This would include a recommendation for a fair and rational basis for allocating financial responsibility among parties.

Staff Response

See response to Comment 11.

Comment 14

The following compliance schedules due dates should be expanded by at least a year.

Task	Description	Current TMDL Compliance Date	RCFCD Recommended Compliance Date
Task 3	Nutrient Water Quality Monitoring Program	3 months after BPA approval Annual reports due August 15	15 months after BPA approval Annual reports due August 15
Task 8	Lake Elsinore Lake In-Lake Sediment Nutrient Reduction Plan	6 months after BPA approval	18 months after BPA approval
Task 9	Canyon Lake In-Lake Sediment Treatment Evaluation	6 months after BPA approval	18 months after BPA approval
Task 10	Watershed and Canyon Lake and Lake Elsinore In-Lake Model Updates	6 months after BPA approval	18 months after BPA approval

Staff Response

As shown in the Attachment to Resolution No. R8-2004-0037, staff agrees that revisions to Task 8, 9 and 10 compliance dates specified in the proposed TMDL are warranted to allow additional time for an appropriate stakeholder group to form and agreements to be developed.

However, because of the need to continue implementation of the existing watershed and lakes monitoring program, staff does not believe that the time should be extended for Task 3 (Nutrient Water Quality Monitoring Program). An extension from a compliance schedule of 3 months to 15 months would result in no data being collected for 1 year after TMDL approval, representing a significant gap in the data collection effort. Staff believes it is appropriate to specify that a plan/schedule for the implementation of the existing monitoring program identified in Task 3 be due within 3 months of TMDL/Basin Plan amendment approval and that, if needed, a revised monitoring program plan/schedule be due within 15 months of TMDL/Basin Plan amendment approval (see the Attachment to Resolution R8-2004-0037).

Comment 15

The District requests that the following discussion be appended to the end of the Introduction of the Technical Report:

“In summary, the science supporting the interim and final TMDL numeric targets for total phosphorous and final TMDL numeric target for total nitrogen (numeric targets) proposed in the BPA is preliminary. Where science was lacking, Staff selected numeric target values conservatively for nutrients. The ability of the TMDL to achieve these standards has been called into question by the Regional Board's own peer reviewer, Dr. Josselyn.”

The district further notes that Dr. Josselyn acknowledges the eutrophic nature of Lake Elsinore and that the lake cannot naturally support the assigned beneficial uses. Acknowledging that additional studies and review are needed, the District points out that revising the beneficial uses to those that can be supported under these natural lake conditions may be warranted.

Staff Response

Comment noted. Staff believes that the record of this matter speaks for itself. In the May 2004 Technical TMDL Report and in Responses to Comments (see, for example, September 17, 2004 Staff Report, Attachment B, comments 15 and 46), staff has acknowledged that the TMDL is based on limited data for the watershed and that a complete understanding of the lake nutrient dynamics and the ecologic health is needed. Recognizing these deficiencies, phased TMDLs and extended compliance schedules are proposed. As shown in the Attachment to Resolution R8-2004-0037, Task 13, the language reflects the fact that the TMDLs will be reviewed and/or revised based on updated data/information.

The Regional Board has the legal obligation to establish nutrient TMDLs since the Board found that excessive nutrient input has caused the impairment of the beneficial uses of the lakes. The TMDLs must be based on the best available data. Using the best data available, staff selected numeric targets that would assure the protection of beneficial uses. However, given the very unique hydrologic conditions of the watershed and the long history of water quality problems in Lake Elsinore, the available data only reflect a snapshot of the conditions of the lake. For these reasons, the TMDL is a phased TMDL and provides the opportunity for updates every 3 years, based on additional data.

Staff would also like to emphasize, as pointed out by US EPA in their comment letter dated June 3, 2004 (see Comment 105 in the September 17, 2004 Staff Report, Attachment B), that the Regional Board committed to submitting the Lake Elsinore/Canyon Lake TMDLs to US EPA by 2005. Moving toward timely adoption of these TMDLs will ensure that this commitment is met.

Comment 16

If the additional science and analysis does not indicate that more assimilative capacity is available in the lakes, then a review of the Basin Plan Beneficial Uses may be in order to determine whether the existing designated beneficial uses for the lakes can be supported by natural conditions. The State Water Resources Control Board has issued draft guidance that indicates that standards should be revised based on attainability:

"If the failure to attain standards is due to the fact that the applicable standards are not appropriate to natural conditions, an appropriate regulatory response is to correct the standards" (December 2003 State Board Draft Water Quality Control Policy for Addressing Impaired Waters)

It is [Flood Control District] Staff's expectation that the phased analysis proposed by this TMDL will lead to the identification of additional assimilative capacity in the lakes and upper watershed.

Staff Response

The basis for the comment that staff's expectation of additional assimilative capacity is not clear. The proposed TMDLs seek to identify the maximum amount of nutrients that can enter the lakes while water quality standards are achieved. The fact that reductions in nutrient loading are necessary speaks to the lack of assimilative capacity. Achieving water quality standards does not necessarily result in increased assimilative capacity.

The beneficial uses of Lake Elsinore established in the Basin Plan are **existing uses** and cannot be removed. The uses may be refined such that less stringent water quality criteria would apply, provided that certain criteria in relevant federal regulations are met. Specifically, a Use Attainability Analysis (UAA) would be required. In staff's experience, conducting UAAs is fairly expensive, and we would not expect it to be a simple or easy process. It is more likely that the numeric targets and resulting TMDL, WLA and LA could be revised based on any additional data and information and/or if additional studies indicate that the lake has additional assimilative capacity to maintain the designated beneficial uses.

Comment 17

The legal basis for the TMDL requirements is not clear. The District does not contest the right of the Regional Board to adopt a TMDL to regulate discharges to impaired receiving waters, however, the regulatory authority to require "retroactive clean up" of the sediments or nutrients in the lakes does not appear to exist in either the Clean Water Act or Porter-Cologne. The District requests that the authority to regulate the removal of sediments from the lakes by the upstream stakeholders be cited in the TMDL basin plan amendment. Without this authority, the Regional Board must assign Tasks 8 and 9 to place responsibility solely on the entities who own the lakes.

Staff Response

Pursuant to Section 13304 of the California Water Code, the Regional Board has the authority to require the **cleanup and abatement** of waste. Specifically, the Water Code provides:

§ 13304 (a) Any person who has discharged or discharges waste into the waters of this state in violation of any waste discharge requirement or other order or prohibition issued by a regional board or the state board, or who has caused or permitted, causes or permits, or threatens to cause or permit any waste to be discharged or deposited where it is, or probably will be, discharged into the waters of the state and creates, or threatens to create, a condition of pollution or nuisance, shall upon order of the regional board, clean up the waste or abate the effects of the waste, or, in the case of threatened pollution or nuisance, take other necessary remedial action, including, but not limited to, overseeing cleanup and abatement efforts.

Staff has identified sources of nutrients to Canyon Lake and Lake Elsinore that have occurred over the long term. The dischargers of those nutrients are responsible for the cleanup and abatement of the nutrients in the lake sediments. The approach that staff proposes to implement through the TMDL is not to issue Cleanup and Abatement Orders to dischargers of nutrients (although the Regional Board has the authority to do so), but to work cooperatively to address the internal sediment loads. Again, there is no reason that this regulatory authority should or needs to be included in the TMDL.

Comment 18

Board staff's contention that the proposed numeric targets are only interpretations of existing water quality standards and not Water Quality Objectives does not comport with the California Water Code. Upon adoption, the numeric targets would carry the weight of water quality objectives. The District supports EMWD's June 3 verbal comments regarding this issue.

Staff Response

See response to Comment 2 and response to Comment 68 in the September 17, 2004 Staff Report, Attachment B.

Comment 19

The recent Superior Court ruling in *City of Arcadia et al/versus The SWRCB and Los Angeles Region RWQCB* (December 24, 2003), states that any amendment of a Basin Plan, independent of whether it adopts water quality objectives, is subject to Section 13241 of the California Water Code. Despite the appeal of this decision, the District holds that the Superior Court ruling was consistent with the intent of the law.

Staff Response

See response to comment 3 in the September 17, 2004 Staff Report, Attachment B.

Comment 20

Current nutrient BMP technologies, particularly those referenced in the September 17th Regional Board staff report, are not capable of economically or technologically addressing the volume of water generated during a wet year. These BMPs are generally sized to treat flows from the average annual storm event and would short-circuit during wet year events. However, wet years are the only years that the upper watershed stakeholders contribute significant nutrient loads to Canyon Lake and Lake Elsinore. If the wet years cannot be treated, compliance with the interim phosphorus target for the TMDL is mathematically impossible for discharges to Canyon Lake.

Staff Response

Staff does not disagree with the assessment presented by the District. However, it is important to emphasize that the TMDLs and corresponding WLAs are to be met as a 10 year running average, with interim compliance with the TMDL, WLAs to be achieved by 2015 and final compliance with the TMDL, WLAs to be achieved by 2020. Staff recognizes that the treatment of nutrients in the large storm events is likely to be difficult, however it may be balanced with years of perhaps zero discharges. Further, as was pointed out in the Response to Comment 2 in the September 17, 2004 Staff Report, Attachment B, it is likely that BMP technology to address the TMDL nutrient discharges in stormwater runoff will advance in the future. The District needs to pursue the development and implementation of such technology; it is inappropriate to assume that current BMPs must necessarily remain the standard of performance. Moreover, as we have pointed out in previous responses to comments (see September 17, 2004 staff report, Attachment B, Comments 18, 57 and 92), compliance may entail the implementation of offset or trading programs, not just BMP implementation.

In addition, staff would like to point out that for the Canyon Lake nutrient TMDL, no reduction in internal loading was assumed. This is one reason that the required reduction in external load is so great. When the stakeholders evaluate options to reduce the internal Canyon

Lake loading, such as through dredging, alum treatment, or other in-lake treatments, (as is required by Task 9 in the Basin Plan amendment), the allowable external load will likely increase; revision to the WLAs and LAs would be appropriate and can be addressed in the periodic review of the TMDL.

Comment 21

Based on the EPA's Urban Nutrient Reduction BMP Costs (1999) referenced in the Regional Board Staff Report, the District constructed a table showing estimated costs associated in the construction of nutrient reduction BMPs in the San Jacinto River Watershed to address the wet year flow volume (139,345 ac ft or approximately 6 billion cubic feet). The cost estimates presume each stakeholder in the watershed tributary to Canyon Lake would implement the specified BMP. Urban Stakeholder BMP costs, based on a rough estimation of land use (both urban areas and non-urban areas tributary to urban systems) and runoff rates, could represent between 50-60% of the total cost identified.

Staff Response

Comment noted. This information will be included in the staff report for the Regional Board's consideration.

Comment 22

Several references have been made at the stakeholder and Regional Board workshops regarding the success of the Newport Bay Nutrients TMDL. Although Orange County (OC) has had great success with achieving nutrient TMDL targets in Newport Bay, the OC-Permittees have noted that the nitrogen concentrations in their upper watershed can exceed 10 mg/l TN and have been able to reduce nitrogen concentrations to 2 mg/l. The OC-Permittees estimate expenditures of approximately \$5 million per year in capital and operational costs in order to achieve the nutrient targets. Stormwater discharges in the San Jacinto Watershed average 2-5 mg/l TN and stakeholders in this watershed will be required to reduce nitrogen concentrations to 0.75 mg/l. The TMDL programs are not numerically comparable – the proposed runoff concentrations to be achieved in the San Jacinto Watershed are significantly lower and economically unachievable under the best available BMP technologies. Further, treatment efficiency for available nutrient treatment BMPs diminishes as the effluent concentration is reduced and as the influent concentration approaches the required effluent concentration. The costs neither balance nor justify the anticipated benefits.

Staff Response

Staff agrees that the Lake Elsinore/San Jacinto River watershed is different from the Newport Bay watershed in that Lake Elsinore is a terminal receiving water that is much more sensitive to the nutrients than Newport Bay, where tidal flushing occurs. The reference to the Newport Bay TMDLs was made, in part, to highlight the success of the TMDL program in the watershed, particularly through commitment by the Regional Board working cooperatively with the stakeholders to address TMDL requirements. Staff's intent in discussing the Newport Bay nutrient TMDL was also to emphasize the similarities between the Newport Bay nutrient TMDL and the proposed Lake Elsinore/Canyon Lake TMDLs. Prior to the approval of the Newport Bay TMDL questions and concerns were raised about the lack of data, appropriate receiving water numeric targets, scientific validity of the TMDL approach, and achievability and appropriateness of the TMDL/WLAs/LAs. These issues are also being raised with respect to the Lake Elsinore/Canyon Lake TMDLs. Yet, in Newport Bay, these issues are being addressed in a proactive manner by the stakeholders and

Board staff with the intent of refining the TMDL in the future. This is the same approach that staff has proposed in the Lake Elsinore/Canyon Lake TMDLs.

Further, stakeholders in the Newport Bay watershed have gotten together to implement the TMDL and achieved the load reduction initially considered economically infeasible and technologically unachievable. The lesson from the Newport Bay TMDL is that once the stakeholders are committed to improving water quality utilizing resources and creativity, the results can be positive.

Additional Proposed Recommendations

Comment 23

Recommendation 1: Set narrative targets for nutrients since the TMDL is predicated on numeric targets that are intended to be more flexible than Water Quality Objectives. Another alternative is to consider the adoption of narrative targets for TP and TN. The narrative nutrient targets could require that discharges from the upper watershed not lead to exceedances of numeric dissolved oxygen concentration targets established for the Lakes; this would provide the stakeholders with additional flexibility to address the algal problems in the Lakes and would ensure that they are not penalized for non-compliance with an arbitrary numeric target.

Staff Response

Staff does not agree that only a dissolved oxygen target is needed for Lake Elsinore. While adequate dissolved oxygen concentrations may indeed prevent fish kills, fluctuations in dissolved oxygen levels are directly related to nutrient input. Dissolved oxygen is a response variable intended to assess the overall lake health; however, according to federal law and regulation, the TMDLs must also include targets that are directly related to the “polluting parameters”, in this case phosphorus and nitrogen.

Comment 24

Recommendation 2: The Regional Board should facilitate the stakeholder organization effort by clearly identifying all responsible parties, including agricultural entities in either the technical report of Basin Plan.

Staff Response

See response to Comment 12. Because of the time that it may take to compile a list of all agricultural operators in the watershed, verify the owners and addresses, staff proposes that this effort be added to the proposed Basin Plan amendment/TMDL as a task for Board staff to complete within 1 month of TMDL approval. Staff will make every effort to complete the list prior to that time.

Comment 25

Recommendation 3: The Regional Board should also clearly identify in the Basin Plan the regulatory tools, such as NOV's, written requests or other actions that can be utilized to assist the stakeholders in gaining the support of the various responsible parties. The list should also identify how these tools may be used to ensure cooperation in and compliance with this proposed TMDL. For instance, how will regulatory tools be applied to assure all responsible parties financially support the joint monitoring requirements and the formulation and implementation of the Lake Sediment Nutrient Treatment requirements?

Staff Response

See response to Comment 12.

Staff also needs to point out that, as the Basin Plan amendment/TMDL indicates, the various named responsible parties in the TMDL are under no obligation to **collectively** implement the various TMDL requirements. Therefore, there are no “regulatory tools” for the Regional Board to use to force parties to work collectively with the other stakeholders to implement the TMDL. However, the Regional Board can provide motivation for collective approaches by requiring individual dischargers to implement the TMDL requirements either individually or through a group approach. It is staff’s opinion that it would make sense for all parties to work together cooperatively to implement the lake and watershed monitoring programs and studies required in the TMDL. The District should be assured that if a responsible party opts not to cooperate with the other stakeholders, all the TMDL requirements still apply and, again, the non-participating responsible party would be required itself to fulfill those requirements.

Comment 26

Recommendation 4: The Regional Board provide a launching point for TMDL implementation by recommending a fair and rational basis for allocating financial responsibility among all parties.

Staff Response

See response to Comment 11.

Comment 27

Recommendation 5: The compliance schedule for joint tasks should be extended by at least one year to accommodate the formation of a stakeholder organization, allow time for stakeholders to secure funding, and provide time for necessary consultants to be selected and contracted with.

Staff Response

See response to Comment 13.

Comment 28

Recommendation 6: If further analysis indicates that the lakes are naturally eutrophic, and thus the applicable standards are not appropriate to the natural conditions, the Regional Board should support a Use Attainability Analysis, or other appropriate mechanism, per the Water Quality Control Policy for Addressing Impaired Waters, to revise designated Beneficial Uses for the lakes.

Staff Response

See response to Comment 16.

Ronald Young
General Manager of Elsinore Valley Municipal Water District
(Oral Comments presented at the September 17, 2004 TMDL workshop and letter dated October 13, 2004)

Comment 29

The role of nutrients (and thus TMDLs) in Lake Elsinore is subordinate to lake level or the climate. Because of their minimal impact, it is unlikely that the TMDLs as proposed will bring any noticeable increase in beneficial uses. However, the lake can be improved without the traditional imposition of more restrictive TMDL values. The LESJWA Biomanipulation Plan that is dependent on a series of mechanical capital facilities is a nontraditional approach by providing appropriate lake ecology and managing and balancing the lake food web to control dominate species such as algal and carp.

Biomanipulation to address Lake Elsinore water quality is not taken into account in the TMDLs.

Staff Response

See response to Comments 71 and 81 in the September 17, 2004 Staff Report, Attachment B.

Board staff has been working closely with LESJWA on the Lake Elsinore restoration plans and studies. Staff has supported the carp removal effort and nutrient removal studies. However, staff is not aware of the Biomanipulation Plan referenced by Mr. Young. According to the draft Fishery Management Plan for Lake Elsinore (EIP Associates, 2004), in order for fishery management to be successful in Lake Elsinore, lake water quality (e.g., nutrient input) must be improved. It is of significant concern to staff that LESJWA's funding will run out before implementing many of the proposed projects and therefore, many of the biomanipulation projects may not be implemented. A similar situation occurred in the 1990's when the Lake Elsinore Management Agency (LEMA) ran out of money. Many of the LEMA projects slated for implementation were, in fact, never implemented, due, in part, to the lack of funds. Hopefully, history will not repeat itself. The TMDL program requires needed watershed and lake monitoring programs and special studies and provides incentives for stakeholders to work together to implement proposed LESJWA projects to improve water quality and the ecological health of the Lake.

Comment 30

The N, P and chlorophyll-a standards are unrealistically low for a lake with such a high ratio of watershed to lake surface area. These targets would not provide acceptable water clarity or protection from fish kills or algal blooms. The targets are not reflective of the historic eutrophic nature of the Lake. LESJWA is currently studying lake sediments (10 meter deep core samples) which have been dated to be between 8,000 and 11,000 years old. Nutrient studies of this core material are currently underway, which could reveal the "natural" past of Lake Elsinore and should affect TMDL limits.

Staff Response

See response to Comment 71 in the September 17, 2004 Staff Report, Attachment B.

The interim TMDL numeric targets for Lake Elsinore were selected based on historical water quality during the 2000-2001 period. The values of the N, P and chlorophyll-a indicate the

eutrophic status of Lake Elsinore. Staff is aware of the LESJWA sediment core study being conducted. As staff has indicated on numerous occasions, if the results of the studies warrant a revision to the TMDL numeric targets, and/or the TMDL, WLAs or LAs, these revisions can be done within the phased TMDL framework.

Staff would also like to emphasize in response to this comment and most of the District's comments, that the proposed TMDL contains specific language for review and update of the TMDL based on the studies and/or data collection effort. **Task 14 specifies that the TMDL will be reviewed every 3 years and revisions made if warranted. This represents a significant commitment by Regional Board staff to continue to work with stakeholders to collect additional information and data on the lake and watershed, review any new data and propose revisions to the TMDL, if warranted.**

Comment 31

Environmental Checklist. In section VIII b) under Hydrology and Water Quality, "no impact" is listed as to the effect of lowering or depleting groundwater supplies. EVMWD is in the process of adopting a Groundwater Management Plan in compliance with AB 3030. If use of the Island wells as part of the source of water for the lake is a mitigation requirement, the impact could contribute to overdraft of the groundwater basin. Review of the Final Draft Elsinore Groundwater Basin Management Plan should be done prior to adoption of the TMDL.

Staff Response

Staff is aware of the effort by EVMWD to develop a Groundwater Management Plan. However, it is not clear to Board staff if EVMWD has committed to supply water from the island wells to Lake Elsinore on a long-term basis. Further, for the initial study for the Recycled Water Pilot Project, no impact from extraction from the Island Wells of 10,000 AF was identified. The CEQA checklist asks if the project would "...substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted?" Since this was not identified as a potential impact in the Pilot Project, staff is not convinced that it needs to be identified as a potential impact in the TMDL Checklist. We also point out that a project such as long term groundwater extraction would need to undergo a separate and complete CEQA review outside of the TMDL CEQA review process. Finally, we note that in the Department of Water Resources, Southern District, April 1981 document titled "Investigation of Groundwater Supply For Stabilization of Level of Lake Elsinore, Riverside County", it was determined that pumping as much as 7,200 acre-feet of ground water annually could be continued for at least 30 years at the present well sites. After that, pumping could be continued for equal length of time at other well sites and that this pumping would have little effect on ground water levels and create no subsidence outside the lakebed.

Comment 32

Nutrient Load Model. The model is used to determine the nutrient loads allowable within the Lake and allocated to various sources. The total phosphorus (TP) limit has been conservatively set at 0.10 mg/l, which is the 25th percentile of a period of data. If a 50th percentile is used (0.12 mg/l), the TP load capacity would increase by 10,000 kg/yr. We believe a closer look at the MOS assumptions, especially for the interim 2015 WLA would be

beneficial and could be the subject of further refinement as the future studies are completed before 2015.

Staff Response

Staff agrees that basing the numeric targets on a 50th percentile results in a load capacity that would allow 10,000 kg/yr more loading of total phosphorus. The 25th percentile is a conservative approach and, more importantly, is consistent with the method recommended by the US EPA in the nutrient criteria development guidance manual. Staff does not believe that the District has provided technical justification for selecting the 50th percentile other than the fact that it results in a less restrictive TMDL. Further, if staff were to propose using the 50th percentile TP values, then it is likely that an explicit MOS would need to be specified because of the less conservative approach of taking the 50th percentile. It may be that factoring in an explicit MOS would result not result in a less stringent TMDL/WLAs/LAs after all. Therefore, staff does not propose to revise the proposed interim TP numeric targets values nor the TP load capacity calculation.

Staff would like to point out that the WLA for recycled water was calculated based on BAT for phosphorus treatment as planned by the Eastern MWD. In fact, the TP concentration of the recycled water from Eastern MWD was determined to be within the TP limit used to calculate the WLA for TP. We also note that the LESJWA budget provides funding for EVMWD to upgrade the treatment plant to meet the TP effluent limit. Staff believes that there is no justification to revise the TP WLA at the present time.

Comment 33

There may be a need to take another look at selecting 1994 as the moderate year for modeling. In may make sense from a hydraulic point of view, but from a nutrient loading perspective it is anomalous in that it follows one of the highest flood years on record. Watershed conditions may not be similar to in-lake conditions that have been altered by cumulative effects of irregular prior years.

Staff Response

Comment noted. Staff agrees that watershed runoff conditions from one year affect in-lake conditions in subsequent years. It is because of that effect that staff is proposing that the TMDL/WLAs/LAs be met over the long term, taking into account varying hydrological conditions, instead of specifying the TMDL/WLAs/LAs as an annual average.

Comment 34

Recommendation 1. A target water elevation of 1246 \pm 1.0 ft msl should be established as a long-term numerical TMDL target. This corresponds to a limnologically more meaningful 26 feet maximum water depth.

Staff Response

See response to Comment 73 in the September 17, 2004 Staff Report, Attachment B.

Comment 35

Recommendation 2. Biomanipulation and in-lake TMDL management targets (methods) should be set in place of numeric N, P, chlorophyll, or Secchi targets, at least in the short term. This would allow time to evaluate results of LESJWA's adaptive management approaches.

Staff Response

See response to Comment 29 above, and response to Comment 74 in the September 17, 2004 Staff Report, Attachment B.

Comment 36

Algae productivity is limited by light and CO₂ and not nitrogen or phosphorus.

Staff Response

See response to Comment 80 in the September 17, 2004 Staff Report, Attachment B.

Comment 37

Recommendation 3. No targets for in-lake nutrients (N and P) should be set with the exception of the DHS rule of less than 10 mg/L as N for Canyon Lake (protection of drinking water).

Staff Response

See response to Comment 75 in the September 17, 2004 Staff Report, Attachment B.

Comment 38

Recommendation 4. Nitrogen should be defined as biologically available Total Inorganic Nitrogen (TIN) not Total Nitrogen (TIN + biologically unavailable organic-N) in lake targets and lake models.

Staff Response

See response to Comments 76, 77 and 79 in the September 17, 2004 Staff Report, Attachment B.

Comment 39

Phosphorus should be defined as either 80% total phosphorus (TP) or bio-available TP.

Staff Response

See response to Comment 77 in the September 17, 2004 Staff Report, Attachment B.

Comment 40

Variable lake levels should trigger change of beneficial use designation in the Basin Plan. With the lake drying out historically, the beneficial use designations of WARM, REC1 AND REC2 may be overstated because of their intermittent opportunity.

Staff Response

See response to Comment 16, above.

Comment 41

Lake Elsinore's primary problem is related to water levels. The TMDL should take water level into account. The primary source of water to the lake is recycled water, however the proposed TMDL could limit the volume of recycled water that could be discharged to the lake due to restrictions on TN and TP.

Meeting the existing TIN Basin Plan objective of 1.5 mg/L would be difficult, if not impossible to meet under conventional nutrient removal processes for recycled water.

Staff Response

See response to Comment 73 in the September 17, 2004 Staff Report, Attachment B.

Recognizing the difficulty in reducing recycled water nutrient levels, as noted in the May 2004 TMDL Report, Board staff has attempted to address WLA compliance by the POTWs. The recycled water permit would allow the implementation of an offset program, should strict compliance with effluent limitations based on the recycled water wasteload allocations be demonstrated to be infeasible. Implementation of an offset program in lieu of strict compliance with the numeric limit would require the discharger to assure removal from the lake of phosphorus and/or nitrogen discharged above the numeric limit on at least a one-to-one basis.

Based on information provided to Board staff by the Director of Operations at the Las Vegas Treatment Plant, in order to meet the Lake Mead WLA with TP discharge limit of approximately 0.26 mg/L, phosphorus reduction has been accomplished at the facility through Bardenpho phosphorus removal (BPR) activated sludge followed by sand filtration to remove particulate phosphorus¹. The proposed interim WLA for recycled water discharges to Lake Elsinore was calculated based on assuming the effluent TP limit of 0.5 mg/L. This seems to be economically achievable and staff notes that LESJWA has already committed to funding to upgrade to treatment plant at the EVMWD to meet this effluent limit. In staff's opinion, these treatment plant modifications could be completed within the 5 year NPDES permit cycle and therefore, staff is proposing to modify the Basin Plan amendment to indicate that compliance with the WLA for Lake Elsinore supplemental water should be met as soon as possible as an annual average.

With respect to nitrogen removal, staff would like to point out that EVMWD could consider un-conventional nutrient removal methods such as wetlands. For example, on average during the period from 1999 through September 2004, Orange County Water District's Prado wetlands, which treats the effluent dominated Santa Ana River, removed 64% of nitrate-nitrogen and the Irvine Ranch Water District's wetlands removed approximately 55% of total nitrogen and 70% of TIN¹.

Because Board staff realizes the importance of providing the recycled water to Lake Elsinore, we have been working with the District to develop an appropriate strategy and plan for implementation of the TMDL and WLA. We must emphasize, however, that while providing a reliable water supply to Lake Elsinore is important, it is also important to control nutrient discharges in the recycled water.

¹ References:

- D. Drury, P. Pai, M. Clyburn, S. Semenza, D. Dielmann, W. Shepherd, 2004, Operational Strategies and Treatment Technologies for Meeting Very Low P Limits, Water Environment Federation, 77th Annual Conference and Exposition.
- Irvine Ranch Water District (IRWD), 2003. San Joaquin Marsh Nutrient Removal Summary, Presentation by Jim Hyde at the [Newport Bay] TMDL review workshop.
- Orange County Water District, October 2004, personal communication with Greg Woodside.

Comment 42

There appears to be salinity toxicity to zooplankton in Lake Elsinore. This affects the abundance of zooplankton that would feed on the algae.

Additional studies are needed to understand the ecology of the lake.

Staff Response

Staff agrees that it is worthwhile to conduct additional studies to gain a better understanding of the lake ecology. As part of the proposed TMDL, staff has included studies to evaluate reduction in internal lake sediment nutrient levels, and updates of the watershed and lake models. If there are additional studies related to nutrients that EVMWD believes need to be required of stakeholders in the TMDL, the District needs to forward that input to staff in order for make that information available for Regional Board consideration.

We also note that if there is salinity toxicity, it may be appropriate to address this impairment through the development of a TMDL. Staff will evaluate the toxicity data and make appropriate recommendations for inclusion of Lake Elsinore on the 303(d) list of impaired waterbodies due to salinity toxicity during a future 303(d) listing cycle.

Comment 43

At certain times, phosphorus is the limiting nutrient in Lake Elsinore and at other times, nitrogen is the limiting nutrient. They don't become the limiting nutrient at the same time. To control both requires costly treatment when it may not always be warranted.

Staff Response

See response to Comments 54, 79 and 81 in the September 17, 2004 Staff Report, Attachment B.

Comment 44

Light penetration is also a factor for lake quality and may be a more important factor for controlling algae growth.

Staff Response

See response to Comment 80 in the September 17, 2004 Staff Report, Attachment B.

**Peer Review by
Robert Gearheart, Ph.D., P.E., Professor of Environmental Engineering
Humboldt State University, Arcata, California
(Letter dated October 10, 2004)**

(Note: Comments are taken verbatim from Dr. Gearheart's letter re "Review of Draft TMDL for Nutrients in Lake Elsinore and Canyon Lake". The comments address two specific studies/assessments and the proposed Basin Plan amendment, as shown below.)

**Comments on the Lake Elsinore and Canyon Lake Nutrient Source Assessment
Report prepared by Tetra Tech (2003)**

Comment 45

"There is no demographic descriptions of the watershed and associated water use, present-future."

Staff Response

At the time the report was prepared, the data were not available to Tetra Tech.

Comment 46

"Was it an objective of this report to allow for WLA to be developed for future land use activities? I don't believe I found any prediction, other than general comments about future land use designation. No mention of the fact that sections of this water shed is one of the fastest urbanized county in the state, for example, with some 10 and 20 years prediction of potential WLA from these changing land uses."

Staff Response

The proposed TMDLs and allocations were developed based on existing land use data and the simulated loads were calibrated with in-stream water quality data. The LSPC model also simulated the nutrient loads in the San Jacinto River Watershed for other scenarios of urbanization: 1) pre-development stage where the entire San Jacinto River watershed was assumed to have nutrient loading and hydrology characteristics respective of forested conditions, and 2) future conditions with land use distributions based on a built-out representation assumed by EMWD (please see page 5-12 of the Nutrient Source Assessment Final Report, Tetra Tech, 2003). The proposed TMDL does not include a specific allocation for future urban areas. If and when new urbanization in the watershed increases and presumably agriculture and/or open space concurrently decreases, the allocations for these sources can be revised to reflect the changes in associated nutrient inputs.

Comment 47

"I am not totally familiar with the area in terms of point source loads from WWTP are there significant loads and /or flows? It would seem that reclaimed wastewater (if treated to a high level) would be the most reliable source of water for use in lake restoration."

Staff Response

The proposed TMDLs include wasteload allocations for recycled water discharges to Lake Elsinore, which are presently authorized on a limited basis (temporally and volumetrically) under an NPDES permit issued by the Regional Board. There are no POTW discharges to Canyon Lake. Staff is unclear what Dr. Gearheart considers as "treated to a high level" –

whether this refers to nutrient reduction or other constituents in recycled water. Staff certainly agree that recycled water is a viable option as a source of supply to stabilize Lake Elsinore, as long as the recycled water does not contribute to nutrient problems in the lake. For that reason, the proposed TMDL specifies nitrogen and phosphorus WLAs for recycled water addition to Lake Elsinore.

Comment 48

"Confusing to me the role of Mystic Lake and Perris reservoir play in the TMDL process. Neither mentions in this section but referred to in section IV. It may assist readers not familiar with the system (this reviewer for example) to have a flow diagram of the hydrological connection of the streams, lakes, drainages, etc."

Staff Response

Comment noted. In addition to the brief discussion in Section 2 of the Tetra Tech Report, watershed hydrology was also discussed in the May 2004 Regional Board TMDL Report (Section 2.1). As described therein, Mystic Lake is an ephemeral lake that is created by the high subsidence rate of the San Jacinto Valley along the San Jacinto fault. During normal to dry years, any water flowing from the headwaters of the San Jacinto River is captured in Mystic Lake; there are no flows to the downstream areas. In very wet years, overflows from Mystic Lake to the San Jacinto River carry flow to Canyon Lake and possibly Lake Elsinore (if there is sufficient flow).

Lake Perris is a Metropolitan Water District Reservoir and is essentially a closed system. Local surface waters flow into Lake Perris and there is no outflow from Lake Perris to the San Jacinto River watershed.

Comment 49

"What is the basis for identifying failing septic tanks, unimpeded access of cattle to stream and unsolicited discharges as not being factors to consider in this report (or did I misinterpret this statement)."

Staff Response

As noted in the Tetra Tech report, septic systems are considered a likely source of nutrients to Lake Elsinore because of their location along the shoreline of the Lake. Further, a high density area of septic systems upstream of Canyon Lake in Quail Valley is also a suspected nutrient source. TMDL regulations and guidance require the evaluation of all existing and potential sources of nutrients and for these reasons, septic systems were evaluated as part of the TMDL development process. Staff realizes that the information and data on septic systems, failure rate, etc. is limited and, accordingly, has added a specific task to the implementation plan to collect this type of data for future refinement of the model and/or TMDL and LA.

With regard to cattle access to the streams, cattle operations in the watershed are confined and cattle do not have access to streams.

Comment 50

"Groundwater sources, cattle contaminated groundwater, and resultant surface water interaction? Fertilizer addition-no mention of groundwater contamination -interaction-surface water? Is there a potential significant load with urban horticultural N and P addition?"

Staff Response

The San Jacinto River is a losing stream; surface water seeps into the ground. The agricultural activities in the watershed, such as cattle ranching, likely contribute to nitrogen to groundwater. However, the groundwater level is several hundred feet below the surface and groundwater does not contribute to surface flow in the main segments of the River. The potential loads from urban horticultural N and P addition were lumped into the total nutrient loads from urban sources. The model was calibrated to the in-stream water quality data (based on data representative of urban sampling locations). The exact mechanism of the nutrient delivery from the urban land was not characterized by the model. In developing BMPs or other nutrient control strategies, the urban dischargers may want to do this type of evaluation.

Comment 51

"Were any attempts made to quantify ammonia volatilization from dairies, an atmospheric source?"

Staff Response

No. In staff's opinion, this was not needed to develop the proposed TMDL or WLA for the dairies. As explained in the May 2004 TMDL Report (Section 5.3), staff made assumptions about atmospheric deposition based on data from Anderson et. al (2001, 2003) assuming that atmospheric deposition constituted a small percentage of the nutrient loads to the lakes (see Figures 5-17 through 5-20 in the May 2004 TMDL Report. As part of the phased TMDL effort, atmospheric deposition can be further evaluated.

Comment 52

"Septic tank phosphorus emission calculations-no attenuation of P through the soil column?"

Staff Response

As discussed on pages 4-24 through 4-25 of the Tetra Tech Report, the phosphorus emission calculations were done outside the model. The phosphorus emission rate (load/septic tank) was based the case studies from other areas. The delivery of the phosphorus loads to the streams was simulated by a dynamic hydrologic model that considers the attenuation along the flow paths.

Comment 53

"How is the water used that has been excessively pumped from groundwater? What are the nutrient levels in the groundwater?"

Staff Response

The water pumped from the ground is primarily used for agricultural irrigation and for domestic water supplies. Nutrient contributions from the lands that are irrigated by groundwater, along with activities such as fertilizer application, were taken into account in the model as part of the total nutrient buildup rate in the watershed model.

Comment 54

"Hydrology-wastewater reclamation-groundwater recharge?"

Staff Response

This meaning of this comment is unclear. Treated wastewater is used for irrigation on agricultural land, golf courses, and urban parks. This use was taken into account in the

model development. There are also efforts by EMWD to recharge groundwater with State Water Project water and/or Colorado River waters, however, staff is unclear how or whether Dr. Gearheart sees this as a factor to consider in the TMDL.

Comment 55

“Water balance for the system-specifically the role of ET on Lake Volume-“

Staff Response

The role of evapotranspiration (ET) for the system (watershed and the lake) was simulated in the watershed model (LSPC) and the lake model (EFDC).

Comment 56

“Pollutant representation-Is it not possible or not useful in the eyes of the modelers to have TSS a primary pollutant to consider in the model. It is mentioned, sediment, in the following sentence as a pollutant to consider for future efforts. It seems that the fate of phosphorus specifically could be tracked with sediment.”

Staff Response

Yes, it would be useful and possible to simulate TSS as a pollutant. Staff agrees that TSS simulation would be a good indicator for particulate phosphorus. However, the objective of the modeling effort was to simulate the nutrient loads, which is a totally different analytical process and procedure from the TSS simulation. Given time and budget constraints, the TSS simulation could not be performed for the purposes of TMDL development but could be considered as part of future modeling efforts to refine the TMDLS.

Comment 57

“The nature of the soils (ACS Soil C and D) in and around the reservoirs, would suggest relatively high P adsorption values.”

Staff Response

Comment noted.

Comment 58

“Internal loads from reservoir are these sinks a significant factor in modeling In-lake chlorophyll production levels.”

Staff Response

The internal loads from the reservoir and the deposition of the nutrients were simulated using a benthic release rate and a simplified 1st order loss equation. The internal loads from a reservoir would be a significant factor in the algal production in Canyon Lake (Anderson *et al.*, 2003). However, the Tetra Tech model did not simulate the chlorophyll production since the objective of the Canyon Lake model was to predict the nutrient loads transported to downstream to Lake Elsinore.

Comment 59

“Model calibration and verification

Graphic analysis of calibration analysis, Fig. 4-22 through 4-25

The model effort appears to do better for the less extreme flows-what is lost by not have the same confidence for the high flow conditions?

Consistent under prediction of TN and TP not fully explained or accounted for in a sensitivity analysis.”

Staff Response

These figures report calibration results for model subwatershed #14, a small, predominately urban watershed located in Hemet. The second paragraph of page 4-36 states that:

“After closer examination of the landuse in subwatershed 14, it became apparent that approximately 30 acres of agricultural land in the area had a pronounced influence on model predictions. For this subwatershed, the operation of the small agricultural area can be quite different than overall assumptions for agricultural areas throughout the entire San Jacinto Basin. Therefore, the slight over-prediction of total phosphorus was considered acceptable because calibration was appropriate in other areas where agriculture is a dominant landuse.”

Model validation was performed for subwatershed 14 and discussed on page 4-38. Additional calibration and validation for urban areas were performed for three subwatersheds (2, 3, and 4) in the Lake Elsinore area (page 4-40). In general, the model predicted TN and TP concentrations within a relative range of observed conditions. Observed concentrations were sparse, with a single sample collected for storms separated by months, whereas model predictions are continuous hourly simulations. Furthermore, many observed data were collected during periods when the model predicted little or no streamflow. Therefore, robust sensitivity analyses to quantify model discrepancy were problematic. Rather, a holistic approach was undertaken to assess model performance graphically with repeated comparison to other locations and time periods in the watershed representative of similar land use distributions.

Comment 60

“Figures 5-7 through 5-10 discussion- have antecedent conditions been considered in the three water year and relative land use assumptions. Limited discussion about these predictions. I would assume this is what the TMDL is all about in terms of source loading. Reoccurrence intervals for these types of water years could be used to develop a loading probability distribution relationship. Not sure what was modified from this report, if any in the draft TMDL amendment.”

Staff Response

Antecedent conditions were simulated dynamically at a 1-hour timestep within the modeling system, and are specific to each storm rather than each water year. During dry periods, nutrients were modeled to build-up on the land surface as a function of land use activities, with rates and maximum limits of buildup determined based on literature values and model calibration. Therefore, antecedent conditions are included within model predictions for each annual hydrologic condition (e.g., dry, moderate, or wet year), dependent on the distribution and magnitude of rainfall events that occurred during each year.

Reoccurrence intervals were not considered because such analyses are often specific to storms rather than annual volumes. Only ten hydrologic years were simulated using the

model, based on availability of representative spatial land use data (limited to observations in 1993) that were likely not representative of historic land use distributions, which change with time, required for analyses of historic hydrology. Ten-year simulation resulted in limited information for estimation of annual hydrologic reoccurrence intervals.

Comments on the Internal Loading and Nutrient Cycling in Canyon Lake/Lake Elsinore by Anderson, et. al. (2002, 2003)

Comment 61

"Both of these documents focused on the lake/s nutrient dynamics with the purpose of the determining the effect of WLA's to the total nutrient budget of the system. I did not have sufficient time to review in any detail the assumptions made in the analysis. It does appear, though, that good science was practiced in terms of sampling protocols (spatial representation and replication), statistical implication, and key nutrient fate and transport processes.

I followed the approach taken by Anderson, ET. Al. and support the conclusions drawn from the analysis. Again I did not have time to determine exactly what portion of his findings were modified in the draft TMD. The potential negative impact (P release from sediments) from the destratification of the shallow region of Canyon Lake is highly plausible and should be carefully evaluated."

Staff Response

Comment noted.

Comment 62

"The effect of Ca precipitation on P removal is suggested but not supported by water quality data showing dissolved Ca, Mg, and Fe concentrations. Conclusions reached by Anderson's model in terms of P loading is significant in terms of the reality of reversing the eutrophic process.

The observed reduction of P levels in the lake over the period of the data set is an interesting observation and not fully explained in the report. "

Staff Response

Ca precipitation and removal of P has been demonstrated in hardwater lakes during "whiting" events, although we agree that it is difficult to draw conclusions from dissolved water column data. We do note, however, that Anderson reported higher concentrations of CaCO₃ (8-24%) and slightly higher TP (277-1392 mg/kg) in material recovered from sediment traps (Table 5.1 in Final Report to SARWQCB, 2001) than in the sediment, where CaCO₃ levels ranged from 0-12.5% and TP ranged from 44-1113 mg/kg (Table 3.1). This does suggest some CaCO₃ precipitation and possible PO₄ co-precipitation within the water column.

The observed reduction in TP concentrations within the water column from 1993-2001 is due to net sedimentation.

Comments on the staff report released on May 21, 2004 and the proposed Basin Plan Amendment language submitted to the Board on June 4, 2004.

Comment 63

"The discussion on page 32, and the associated Figure 5-2, suggests that P is not buried in the sediment (as in a long term removal process). Discussion concerning phosphorus in the core samples seemed to deal more with the pore water not the fixed P. Perhaps there was information in the study but I did not find it. Given the type of sediment found in the lake I would guess that some P is driven to an ultimate sink. Even when all of the sediment is detrital material some of the P is buried, example Klamath Lake Oregon. I am not sure it would change the conclusion if it was a factor, but it appears to be missing in the conceptual modeling of the system."

Staff Response

Please see response to Comment 62. Figure 5-2 shows the P budget for Lake Elsinore during the 2000-2001 period. It is true that over a long period of time, the P concentration in the water column does decrease as long as the lake level remains stable. But when the lake level drops, the P concentration in the water column tends to increase in the absence of external sources. This suggests that there is a net release of P from the sediment due to resuspension and flux. The P model used for calculating the P load capacity considered the sedimentation, flux and resuspension processes.

Comment 64

"While it appears to me, given the watershed condition, the climate, the land use activities, and the historic limnological conditions in the lake that there would a strong possibility that the requisite P and N loadings to reduce eutrophic conditions in the lake would not be possible. This is an example where the TMDL has no real application in terms of a likely outcome that removes the impaired water body status. Based upon the increasing pressure of development in eastern Riverside County and the internal load in the lakes the system it is probably non-reversible (Anderson 2002 and 2003)."

Staff Response

The June 4, 2004 Technical TMDL report explicitly acknowledges the difficulties in restoration of Lake Elsinore, given limnological conditions and the long eutrophic history of the Lake (pages 15-16). The numeric targets proposed recognize the virtual impossibility of changing the status of Lake from eutrophic to mesotrophic. However, staff believes that significant improvements can be achieved through implementation of the TMDL. Limnocosm studies have shown that some treatment measures can indeed reduce the internal load (e.g., aeration, alum treatment and metal salt addition). Literature review also suggests that carp removal can reduce the internal loading rate. An increased lake level would also likely reduce the resuspension of organic rich sediment.

Comment 65

"The watershed loading and lake modeling efforts are well done and are representative of models that are commonly applied to conjunctive watershed/lake systems. The verification of the models suffer, as to many models, from lack of data. This is a particular problem with extreme water balance conditions, such as no out flows."

Staff Response

Comment noted.

Comment 66

"I personally would have been interested in knowing more about the ecology of the lakes in terms of algal species, zooplankton species, fish species etc. There was mention of N fixation but little discussion of its temporal and/or spatial implication. Considering the fact that the nutrient balances were on an annual basis these factors might not be significant, but might be interesting in terms of seasonal fluctuations."

Staff Response

The ecology of the lake has been better understood through recent work conducted by Dr. Anderson and his student (Rebecca A. Veiga Nascimento and Michael A. Anderson, 2004, Zooplankton and Aeration Monitoring at Lake Elsinore – Draft Final Report). However, the rate of N fixation has not been determined. There is an ongoing effort to develop a N model for the lake as well.

Comment 67

"The study's support the conclusions that the eutrophic condition of the lakes will remain in an impaired status due to the internal load of P. The nitrogen limiting condition is not fully documented but strongly suggest based on the annual loadings analysis performs in the studies. The recommendation of setting a target of 0.1 mg/l of P is justified based upon the loading studies but not necessarily ecological supportable in terms of eutrophication processes. Phosphorus levels of 0.08 to 0.010 mg/l are commonly cited as the limiting level for eutrophication."

Staff Response

"See response to Comment 63. Achieving the proposed TP target of 0.1 mg/l would improve the quality of Lake Elsinore but not remove its eutrophic status. Historical evidence suggests that the Lake may be naturally eutrophic; therefore, staff believes it would be infeasible to restore Lake Elsinore into a mesotrophic or oligotrophic lake."

Comment 68

"While there is no real discussion and or feasibility analysis of BPM's and restoration alternatives in these studies there are some options that should be considered. One option would be extract the internal load and external load by processing through wetlands. Since TDS apparently are not a real issue, the P fixed in wetland plants could afford marginal habitat improvement if the water loss could be lived with. This concept would be to find portion of the lakes to restore to habitat value and recreational uses."

Staff Response

Due to the long history of water quality problems of Lake Elsinore caused by eutrophication and to the Lake's unique hydrology, the proposed TMDLs were drafted to give the control measure implementation flexibility to the responsible parties. Regional Board staff has worked closely with LESJWA to evaluate different options to remove nutrients from the lakes. One option that has been evaluated is wetlands treatment. Staff expects to continue to work with stakeholders to identify appropriate nutrient reduction strategies.

Comment 69

"The other types of things being looked at are the effect of certain humic compounds on the phyto-plankton populations. I am assuming blue-green algae are present since there is mention of N fixation. An example of an in-lake treatment for eutrophic bodies of water is

based on the use of humic compounds released from the aqueous decomposition of various plant material. There is considerable literature and operational research activities dealing with barley straw humics in Scotland. There is some evidence that the humics (brown water) from tule wetland perform in a similar manner. Historic references, for example, by Native Americans around Klamath Lake suggest that brown water conditions from leached humic materials reduce blue-green algal populations in the late summer months.”

Staff Response

Comment noted. Staff has collected literature materials on the subject that we will make available to LESJWA and other responsible parties for consideration.

Comment 70

“I think there should be some mention of the drought conditions that appear to more of a long-term cycle or possible new status quo condition in the draft TMDL. Given the drought conditions and potential global warming factors some mention should be made on the impact of reclaimed wastewater in the system within the context of the draft TMDL. Perhaps some mention of how reclaimed wastewater can be used to modify the impaired water bodies. When suggesting an interim P level of 1.0 mg/l one is within the economic range of nutrient removal processes in the water reclamation systems.”

Staff Response

Staff recognizes that the drought condition is a more frequent phenomenon. Initially, staff did attempt to draft a TMDL that identified load capacities, wasteload allocations and load allocations specific to wet, moderate and dry hydrologic conditions. But this approach proved impractical from an implementation standpoint. Therefore, staff proposes to use a weighted average approach considering the relative frequency of the hydrologic conditions over a 10-year period. As for the reclaimed water discharge into the lake, staff agrees that this is an important source of supplemental water to Lake Elsinore. Staff has proposed a WLA for the recycled water with an interim P effluent limit of 0.5 mg/L. Staff notes that recycled water discharges in the Great Lakes area have a P limit of 1.0 mg/L. However, Lake Elsinore is a terminal lake located in a mediterranean climate zone with a long algal growing season. The Lake is much more sensitive to nutrient input and a more restrictive wasteload allocation is necessary. In staff’s opinion, the interim P limit of 0.5 mg/L for reclaimed water is achievable technologically and economically (see response to Comment 41, above).

Comment 71

“From this reviewers’ observation the methods and data sets used in these reports are representative of accepted scientific and engineering procedures and protocols. The report supports the conclusions and recommendations with the exception of the role of P fixation in the sediment via precipitation/adsorption processes. The only caveat is that there is no analysis of BMPs to meet these loads in terms of effectiveness, reliability, level of participation, and spatial and temporal application. I would tend to be very pessimistic in terms of being able to reverse the impaired nature of these water bodies in both the interim (2015) and final (2020) time frame.”

Staff Response

Comment noted. Also see response to Comments 64 and 68.